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This churning goes on, gradually growing thicker with accumulated mud, until the vent becomes choked, as it did a few years ago. Then there came a fearful explosion, when the huge monster threw up and out the whole mass, and threw it, as I judge, for 150 feet, plastering thus the stumps and trees with the black vomit. This awful mud was so sticky that it adhered to the trees from top to bottom for, surely, several months, and they looked sick indeed. It was really a hideous sight.

I met some one who told me the Mud Geyser was much "changed." He evidently had simply observed that it was now playing with muddy water not so dense as before; but he had failed to observe the mud on the trees and the surrounding earth, which would have led him to note that its force was not only well sustained but for once seemingly overdone. Indeed, it was no evidence of change, but a part of the programme, as the clock ticks every second, striking at given periods of an hour, and the strike does not betoken change, but regularity of longer intervals, some seconds, some hours. So ever go on these changes in the Park, that are no changes at all, but periods that are marked by wonderful regularity, endless variety.

No man can say that he has visited earth's greatest wonder until he has made at least one complete tour of the Yellowstone National Park. It can be made with perfect ease, and for a very modest expense. It is the nearest to Nature's heart you can possibly get.

GEOGRAPHICAL RECORD.

AFRICA.

LAKE CHAD.—In a recent address, entitled *From the Niger to the Nile* (Scot. Geogr. Mag., Jan., 1908), Lieut. Boyd-Alexander noted the supposed decrease in the area of Lake Chad. It is his opinion that the lake does not alter much in size, and that the supposed greater original area is due partly to inaccurate surveying and partly to the fact that certain villages are several miles distant from the lake, giving the impression that they were formerly on the shore line. The position of these villages Lieut. Boyd-Alexander believes to be due to the danger of flooding during the blowing of the Harmattan, which causes the water to flow 600 yards over the land with an ordinary wind, and drives it as far as two miles when the wind is strong. Where there are good banks, and where the water is not influenced by the prevailing winds, there are many villages close to the lake. A chain of islands, once separate and now more or less joined by a marsh, has also given the impression of increasing aridity, but this change may very likely be due to the silting of mud and sand against the obstruction of the islands by the opposing influences of the Yo and the Shari, the two rivers that feed the lake. R. DeC. W.

METEOROLOGICAL WORK IN SOUTHERN NIGERIA.—For some months past, Mr. C. Fitzhugh Talman, assistant librarian of the Weather Bureau in Washington, has published in the *Monthly Weather Review* a series of short articles dealing with the history and the present status of meteorological observations in a good many of the more remote and climatically less known countries of the world. One of the most useful features of these discussions is the maps which have accompanied them, showing the locations of the meteorological stations in the different countries. The October *Monthly Weather Review* (1907) contains an account of the *Meteorological Stations in Southern Nigeria.* The work in Southern Nigeria is under the direction of the Department of Surveys, with headquarters at Lagos. There are now 36 meteorological stations in the colony. The Lagos Observatory, which is the principal station, is well equipped with standard instruments. The remaining stations, of the second class, have maximum and minimum thermometers, ordinary thermometers and rain gauges. Observations are made twice daily at Lagos; once daily (9 A. M.) at the other stations. R. DeC. W.

RAINFALL OF GERMAN SOUTHWEST AFRICA.—All available rainfall data for German Southwest Africa have been collected, reduced and charted by Dr. Emil Ottweiler (*Die Niederschlagsverhältnisse von Deutsch-Südwestafrika,* Danckelmann's Mitteilungen aus den Deutschen Schutzgebieten, XX, Pt. I., Berlin, 1907, pp. 84). December, 1882, marks the establishment of the first rain-gauge, at Omaruru, in Damaraland, but few stations came into existence before 1890. There are now somewhat less than 100. Almost all of the rainfall comes in late spring, summer and early autumn, *i. e.,* from October to March. Hence Dr. Ottweiler has very wisely taken the year as running from July to June, thus keeping the rainfall of each season undivided. In the tables the different seasons are distinguished by washes of different colors, *e. g.,* the winter months are blue; the spring months, brown, and the summer months red. A rainfall map, and diagrams accompany the report. Along the coast the rainfall is less than 2 inches a year. It reaches 10 inches at a distance of about 150 miles inland.

R. DeC. W.

AMERICA.

THE ROCK BED OF THE HUDSON RIVER.—One of the greatest problems in the construction of the aqueduct that is to bring 500,000,000 gallons of water a day from reservoirs in the Catskill Mountains to New York City, is that of crossing the Hudson River. The original plan was a tunnel under the river at Cornwall, fifty miles above New York, the tunnel to be driven from vertical shafts, sunk in Mts. Storm King and Breakneck and to be over half a mile long.

The results of drilling in the bed of the Hudson to ascertain the character of the ground and the depth to bed rock have been surprising. Although the greatest depth of water is less than 100 feet, the rock bottom is found to descend abruptly beneath a mass of mud and sand boulders and a drill hole in the middle of the river has failed to reach bed rock at a depth of 580 feet. Professor

W. O. Crosby, who is studying the geological problems connected with the work, believes that the lowest point of the rock floor of the Hudson River Valley opposite Storm King must be about 650 feet below the surface of the river. The 17-foot circular concrete tube which will carry the water under the Hudson must be in bed rock in order to support the pressure and it will therefore be necessary to sink shafts nearly 1,000 feet below grade level of the aqueduct in order to pass under the river in solid rock.

Drill holes in the Moodna Creek valley, west of Cornwall, show that the creek flows on top of a thick deposit of sand and gravel filling a deep U-shaped rock valley. This ancient buried topography under the sand and gravel deposit may necessitate the construction of a single, inverted syphon, three or four miles long, to go under both the Moodna and Hudson Valleys, instead of one under the Hudson alone as originally contemplated. The diamond drill has revealed the strength or weakness of the rock at vital points and details of bed-rock topography which in many places are hidden by thick glacial deposits. (Condensed from *Economic Geology,* Vol. 3, No. 3.)

QUALITY OF THE WATER IN THE GREAT LAKES.—The U. S. Geological Survey has completed an investigation of the quality of water in the Great Lakes. It is found that, except along shore at times of high winds, the water in all the lakes is practically free from suspended matter of any kind. The water of Lake Superior contains the least amount of dissolved solids; that of the Lake Huron outlet, including water derived from lakes Superior, Michigan, and Huron, ranks next. Lake Michigan is third with about twice as much dissolved matter as Lake Superior. Lake Ontario is a trifle more highly mineralized than Lake Erie and contains two and a quarter times as much dissolved matter as Lake Superior water. It was found that 3,350,000 pounds of dissolved minerals pass out of Lake Ontario each year. Of this great quantity, 441,000 pounds come from Lake Superior, 666,000 pounds from Lake Michigan, 913,000 pounds from Lake Huron, 840,000 pounds from Lake Erie, and 490,000 pounds from Lake Ontario. The drainage area of Lake Erie contributes far more than its proportionate share to the total mineral matter.

SOLAR RADIATION AND TERRESTRIAL CLIMATE.—The *Annals* of the Astrophysical Observatory of the Smithsonian Institution, Vol. 2, has just appeared. This second report is published eight years after the first was issued. It contains 245 quarto pages, with many tables and diagrams of the observational results. The careful and comparable measurements of the solar variation here recorded extend over a number of years and indicate that the sun's radiation varies in its intensity from time to time and that these variations are sufficient to affect appreciably the temperature of the earth.

The Observatory was founded in Washington through the efforts of the late Secretary Langley, who was its director until his death. He expressed the hope that careful study of the radiation of the sun might eventually lead to the discovery of means of forecasting climatic conditions for some time. Not only have researches on the relation of the sun to climate and life upon the earth been carried on at this observatory, but similar investigations have also been in progress at the Mount Wilson Observatory, Cal., since its establishment. These observatories are separated by 3,000 miles in distance and 6,000 feet in elevation.

The report gives some reason to believe that Dr. Langley's hope may in time be realized, though the investigation as yet is far from reaching the satisfactory degree of knowledge which the science of meteorology demands. The report says that from a comparison extending over thirty years of the temperatures of forty-seven stations well distributed over the land surface of the earth it appears possible that changes of solar radiation do produce, not infrequently, well-marked and recognizable changes of temperature over the continental areas of the world. Such changes of temperature would be predictable if accurate measurements of the solar variation were systematically continued at a few favorable stations.

Proof is adduced that the surface of the earth radiates very slightly through space on account of the interference of clouds and water vapour with terrestrial radiation. The substance which maintains the earth at nearly constant temperature by emitting to space radiation about equal to that received from the sun is the layer of water vapour at 13,000 to 16,000 feet of elevation.

SURFACE WATER SUPPLY OF THE GREAT BASIN.—Water Supply Paper, No, 212, gives the results of the hydrographic study of the Great Basin in 1906. After a geographical description of the region its drainage is divided for convenience of treatment into four areas, viz., Wasatch Mountains, Humboldt Sink, Sierra Nevada, and Great Basin Drainage in Oregon. The amount of water available for storage at possible reservoir sites, and also for use in various canal systems in operation or projected is shown.

PETROLEUM IN 1906.—The production of petroleum in the United States in 1906 was 126,493,936 barrels, worth $92,444,735. This output from the five great fields was distributed as follows: Appalachian field, 27,741,473 barrels; Lima-Indiana-Illinois field, 21,951,711 barrels; Mid-Continent field, 21,718,648 barrels; Gulf field, 21,645,425 barrels; California field, 33,098,598 barrels; and from scattered States and areas, chiefly Colorado and Wyoming, 338,082 barrels.

California, the largest producer, supplied nearly one-fourth of the total output and still holds first place as to quantity, while Kansas, Indian Territory and Oklahoma together hold second place. The greater part of the oil from the California and Gulf fields is consumed as fuel, but only a small proportion of that produced in other fields is so utilized. The most important features of the petroleum industry in 1906, as summarized by Mr. W. T. Griswold of the U. S. Geological Survey, are:

1. The extension in area and the increased daily production of oil in the Mid-Continent field.
2. The expansion of the area in Illinois from which oil is being produced, from its original discovery near Casey southeastward into Lawrence County.
3. The growth of the consumption of fuel oil in California, which in 1906 exceeded the total production of the State for the year.
4. The falling off in production of the pools of the Coastal Plain district of the Gulf States.
5. The continued decrease in the average daily production from the Appalachian field.
6. The laying of the second pipe line from the Mid-Continent field to Whiting, Ind., and the building of a pipe line across the Isthmus of Panama for the delivery of oil from the California field to the Atlantic Ocean.

ORIGIN OF WESTERN PLACE NAMES.—The Chicago and Northwest Railroad system has sent to the Society a volume of 202 pp., containing many hundreds of place names of Western towns through which the lines of that railroad pass, arranged alphabetically and each accompanied by a concise statement of the origin of these place names. The information was collected by an officer of the system and the compilation shows much care.

THE FALLS OF NIAGARA.—The Geological Survey of Canada has published the report of Dr. J. W. W. Spencer on the special surveys and studies made for that Government relating to the origin and history of some features of the Niagara Falls region. His report, entitled "The Falls of Niagara—their Evolution and varying Relations to the Great Lakes; Characteristics of the Power and the Effects of Its Diversion"—is rich in information. Dr. Robert Bell, Director of the Geological Survey, having commissioned Dr. Spencer in 1904 to prepare a monograph upon the Falls, the Survey was begun in June, 1905, and the field work was completed in October, 1906. The investigations included soundings in the gorge, the whirlpool and even under the Falls themselves; borings to ascertain the character of the buried channel beds over which the river flowed; instrumental surveys of the old river banks and the position of the strata; and the study of lake fluctuations and meteorological changes. The unexpected depth of 192 feet was found underneath the Canadian Fall. The soundings were ingeniously carried out with the result that the shape of the entire gorge is more accurately known now than heretofore.

The investigation of the form of the gorge and the structure of its rock sides and bed gave data for a recalculation of the rate of recession. Dr. Spencer finds that the mean rate of retreat for the Canadian Fall from 1842 to 1905 was 4.2 feet annually; and about .6 of a foot annually for the American Fall. The rate of recession in future will be less, partly on account of the large quantity of water diverted for power purposes.

After analyzing the components which have affected the recession of Niagara Falls, Dr. Spencer tells the story of their retreat and gives his conclusions as to their approximate age.

He says the Fall at first was only thirty-five feet high with a volume of 15 per cent. of the present Falls. Receding a short distance, the height increased and the Fall was separated into two cataracts. The time required for the recession of the double Falls to Wilson Point was 31,600 years in addition to 3,200 years during the earliest stage of recession; and 700 years more to the head of Foster flats, the whole distance being nearly three miles. "This was the length of the gorge excavated during the Erie Epoch. From now onward the recession was very rapid, modified at times, but in all requiring only about 3,500 years, so that the age of Niagara Falls may be placed at about 39,000 years. Slight variations on one side or the other are probable, but, under the conditions all of which are now apparently known, the error in calculations will not exceed 10 per cent."

The book is finely illustrated with half-tone photographs and maps.

CANADIAN GEOLOGICAL SURVEY.—In the recent reorganization of the Canadian Geological Survey, the geologists and the Government engineers are grouped in a single but divided organization. At the head of the mining and geological activities is the Minister of Mines, that office now being occupied by Mr. Templeman. The executive head under him is the Deputy Minister of Mines, which position is filled by Mr. Low, though, on account of ill health, he is absent on leave. The two distinct branches are the Mines branch, of which Dr. Howell is the Director, and the Geological Survey, of which Mr. Low is Director and, during his illness, Mr. R. W. Brock is acting Director.

RAINFALL OF CENTRAL AMERICA.—Dr. Alfred Merz has prepared a discussion and map of the rainfall of the Panama Canal region and the adjacent parts of Central America, using the data collected in connection with the construction of the canal (*Beiträge zur Klimatologie und Hydrographie Mittelamerikas,* Leipzig, C. G. Naumann). The isohyetal lines show a range from 1 meter to 6 meters.
R. DeC. W.

CLIMATOLOGY OF LA PAZ.—Victor E. Marchant, chief of the section of Climatology and Agricultural Exploration of the Ministry of Agriculture in Bolivia, has prepared a report on the climatology of La Paz (*Estudio sobre la Climatología de La Paz,* La Paz, Pp. 48. Pls.). The means are based on a period of less than 10 years. The mean annual temperature is 50.4° F. The coldest months are June and July, with 45.3°; the warmest are November and March, with 53.9° and 54.7° respectively. The absolute extremes were 75.2° (January, 1903), and 26.6° (June, 1901). The rainfall varied from 15.88 inches in 1901 to 32.84 inches in 1903.
R. DeC. W.

ASIA.

ASCENT OF MOUNT KABRU.—The recent bold and successful ascent to the summit crest of Kabru in the eastern Himalayas has been noticed in the newspaper press. The *Alpine Journal* (Feb., 1908) gives further details. The ascent was made by two Norwegians, Mr. Rubenson and Mr. Monrad-Aas, in October last. They approached Kabru on the southwest side, and at about 16,000 feet reached the actual foot of the mountain. Here they started on the climb with a week's provisions and fourteen picked coolies. Up to 19,500 feet the ice and snow presented no great difficulty and a second camp was established at this point.

From this camp to the next, five days of step-cutting up the ice slope were required. The coolies, after being trained to use the ice-axe and rope, proved excellent mountaineers. The third camp was formed on a small flat where the party rested two days. The route above Camp 3 was not so difficult as the ice work above Camp 2, but blocks falling from the high ice wall on the left necessitated constant vigilance. Still higher, enormous crevasses in the ice were crossed with some difficulty. The elevation of the next camp was computed to be about 21,500 feet above sea-level.

From this point the Norwegians decided to make the final attempt for the summit; but when they topped the ridge between the "Dome" (marked on Freshfield's map as a peak just in front of Kabru) and the northeast peak of Kabru, they found that they would not have time to climb to the summit and descend safely the same day. They therefore deferred the attempt to another day and returned to camp.

Next day the camp was brought up to the point reached the day before, and the night was passed at about 22,000 feet. The cold was intense, the thermometer registering—29°C. All the coolies were sent back to the lowest camp excepting two, who were huddled with the Norwegians in one small tent.

On Oct. 20, the final attempt to reach the summit was made. The cold was so great and the wind so high that it was very unpleasant and difficult to walk. The four slowly advanced, cutting steps in the hard snow and stopping, now and then, to look after their feet, which were near freezing. At about 5 P. M. they felt sure that the summit was just above them and, at 6 o'clock they reached what was thought to be the top, till they saw a low snow ridge, some fifty or sixty feet higher, which they were certain was the actual summit. The sun had set, the descent was rather dangerous and difficult, and they did not dare to go on, as it would have meant death to spend the night at that altitude. They were thus compelled to turn back.

The altitude reached was about 22,900 feet, the highest on record. The two peaks of Kabru do not vary much as to height, but Mr. Rubenson believes that the southwest peak is a trifle the higher. It is marked on the map as 24,015 feet.

Kabru stands a little west of Kangchenjunga, now classed as second among the high summits of the Himalayas. The expedition had spent over a fortnight on the ice. Neither of the Europeans suffered severely from the mountain sickness, but some of their coolies were badly affected, while others did not mind the high altitude. Mr. Rubenson thinks it is possible to climb much higher mountains than Kabru.

COAL RESOURCES OF NORTH CHINA.—Mr. Bailey Willis, of the U. S. Geological Survey, has written a paper on "The Mineral Resources of China," in which he expresses the conviction that Baron von Richthofen's estimate of China's coal resources was excessive. In his opinion China already has need for all the coal that she can mine to the depth permitted by Chinese methods; and when the Empire develops her industries, he thinks that the capacity of all the coal mines will be taxed to supply the home demand. Believing that her need for coal will be enormous, he does not think the country will be able to export the commodity.

Analyzing the results of the studies by von Richthofen, Pumpelly, and Drake, as to the coal resources of north China, he roughly estimates that the total amount of coal in that part of the empire is 605,000,000,000 tons, which may be 1,000,000,000 tons more or less out of the way. There are large coal areas also in south China, but, as far as is yet known, the greater part of the coal reserves of the Empire is in the northern fields, and Mr. Willis's estimate of their content is 45,000,000,000 tons less than our Government estimate of the total amount of coal in our Appalachian fields.

These views may tend to modify our earlier conception of China as a coal reserve for Europe and America when our reserves shall run low. They will be subject, however, to important changes when more exact knowledge shall be gained of all the Chinese coal areas.

A NEW MAMMOTH EXPEDITION.—The Imperial Russian Academy in February despatched an expedition to the mouth of the Yana River, Siberia, to secure the body of the mammoth unearthed there last year and transport it to St. Petersburg. The leader of the party is the geologist K. A. Wolossowicz, known for his participation in the polar expedition of the late Baron Toll. His chief assistant is the zoologist E. W. Pfizenmaier, who helped to recover the remains of the mammoth found in 1901 on the Kolyma River. The skeleton of this specimen covered with its stuffed hide, is now the most conspicuous object in the Zoological Museum of the St. Petersburg Academy.

The route of the party is from Irkutsk down the Lena to Yakutsk, across the mountains to Verkhoyansk, and down the Yana to Ustyansk, from which a further sledge journey of about 150 miles will bring the expedition to the mammoth. The prize will be carried upon sleds to Bulun on the lower Lena, whence a ship will take it up the Lena to the Siberian Railroad. Wolossowicz will remain behind to study the geological conditions near the mouths of the Indigirka and Kolyma rivers. He is likely also to visit the New Siberian Islands. (*Petermanns Mitt.,* 1908, No. 3.)

DR. MERZBACHER'S NEW EXPLORATIONS IN THE TIAN-SHAN.—A letter from Dr. Merzbacher, dated "Kulja, Feb. 9, 1908," to the *Geog. Jour.* for April describes the purposes of his third journey into the Tian-Shan Mountains and the results of his latest studies. It was his opinion that his earlier observations, copious as they were, still did not supply him with an adequate basis for his investigations into the history of the more recent development of the mountains. He decided to draw within the compass of his researches the eastern parts of the Central Tian Shan. The past year was devoted chiefly to the exploration of the river systems of the two greatest mountain rivers draining the northern slope of the central Tian-Shan—Kok-Su and Agias. Their hydrographic system was investigated to their highest sources, and special attention was given to the structure and composition of the mountains and the causes of the peculiar valley formation. These two river regions in extent fall short of the glaciers of the great longitudinal valleys, Sary-Dokhas, Inylchek, etc. The largest of them are not over 7½ to 12½ miles long, but their number and diffusion are very great. Glaciation is notable, and the total extent of territory covered by firn and ice is far larger than had been expected. Dr. Merzbacher intended to start for the mountains again early in March upon the arrival of his new geological assistant, Dr. P. Groeber.

AIDS TO NAVIGATION IN CHINA.—The Imperial Maritime Customs has just printed (III—Miscellaneous Series; No. 6) a list of lighthouses, light-vessels, buoys, and beacons on the coast and rivers of China, corrected to Dec. 1, 1907, and accompanied by maps showing the position and range of these lights. There are sixty river lights on the Yangtse above its mouth and fifty-four along the coast from Newchwang to Hainan.

AUSTRALASIA.

A HALF-BREED TASMANIAN.—Dr. Richard J. A. Berry, Professor of Anatomy in the University of Melbourne, visited Kangaroo Island, south of South Australia, early in 1907, where he found Mrs. S., a genuine half-breed Tasmanian, who was born on that island some 75 years ago as the result of the union of a white man with a native Tasmanian woman. The last Tasmanian man, William Lanney, *alias* King Billy, died March 3, 1869, aged 34. He was outlived by the woman Truganini or Lala Rookh, who died in May, 1876, aged about 73 years. With her the native Tasmanian race became finally extinct, and there now remain but a few half-breeds, of whom Mrs. S., the subject of a paper by Dr. Berry (*Proc.* of the Royal Soc. of Victoria, Vol. 20, Part 1), is perhaps the oldest.

In 1819 a white man arrived on Kangaroo Island from Tasmania bringing two aboriginal women with him, one of whom was the mother of Mrs. S. The child was educated by the wife of the head keeper of the Cape Willoughby lighthouse, married a white man, and has one son and two daughters. Dr. Berry was impressed with her remarkable intelligence and the purity of her English speech. Her photograph, as Dr. Berry mentions, shows that she bears many striking resemblances to her aboriginal fathers as described by Bonwick, particularly in the colour of the skin, the width of the mouth and nostrils, the weak chin and the dark eyes.

The author discusses some of the debatable points in connection with the lost Tasmanian race. Many anthropologists believe that the Tasmanians were one of the oldest of peoples and that they were not a part of the aboriginal stock of Australia. Dr. Berry shares the view of Howitt and some other writers, that the Tasmanians came from the north, probably from New Guinea, and that they reached Tasmania at a time when there was land communication between it and Australia.

TROPICAL AGRICULTURE IN WESTERN AUSTRALIA.—The Surveyor-General of Western Australia has sent to the Society the report made by W. V. Fitzgerald on his investigation of a part of West Kimberley, the most northern division of that State. His field work was between 16° and 18° S. lat. and west of 127° E. Long. About 1,250 miles of country were examined, and Mr. Fitzgerald reports that in this district over 1,000,000 acres of land are suitable for raising tropical products. This fertile area is only a small part of similar country in the Kimberleys. Possibly some of the numerous islands near the northern coast will be found suitable for the cultivation of the cocoanut palm on a large scale.

EUROPE.

DISAPPEARANCE OF LAKE MÄRJELEN.—All who have made the ascent of the Eggishorn know the little Lake Märjelen, situated a little north of the mountain and hemmed in on its west side by the great glacier of Aletsch. This lake disappeared in a night in August last, and it is supposed that a crevasse opened in the Aletsch glacier on a level with the bottom of the lake, and the sheet of water was quickly drained. Much damage was done to the lands of the peasantry in the valley below the glacier. The lake has similarly disappeared on several occasions during the past century, and in 1888 a dam was built along its western edge to prevent such disasters. There was no sinking of the lake till last summer, and it is believed that the dam became undermined, giving the water a chance to escape as in earlier years.

THE DISPERSAL OF FOG.—At the request of the London County Council, Dr. W. N. Shaw, Director of the British Meteorological Office, has recently looked into and reported upon certain proposals made by one Demetrius Maggiora, "to prevent the formation of fog, or to disperse it in case it is already formed, and also to disperse and destroy all clouds, and to prevent rain, hail-storms, lightning and thunder." From Dr. Shaw's report, the following is taken:

> The apparatus which Signor Maggiora now offers for removing London fog is apparently on similar lines to that supplied in Italy for dispersing hail-storms. From the scientific point of view hail forms a much more specious opportunity for human interference than fog. The atmosphere is then in a state of great commotion preceded by abnormally unstable conditions. A London fog is

incidental to conditions of unusual stability, and Signor Maggiora's memorandum suggests no physical process which could produce any effect in accordance with the known physical properties of the atmosphere.

It may be remarked that the weight of a cubic mile of air is about five million tons, and consequently the weight of fog-laden air, in the case of a fog a mile thick extending over the district of greater London alone, is 3,000 million tons. It is obviously useless to attempt the motion of so great a mass by mechanical action. . . .

I may sum up by saying that the claim to prevent or disperse fog is entirely unsupported by any evidence. The claim to prevent rain is opposed by the more frequent claim of similar processes to produce rain in countries which suffer from drought, and the claim to affect hail-storms (which is associated with that regarding thunder and lightning) is not allowed by the scientific experts of Austria and Italy who have conducted special investigations on the subject for their respective Governments.

The Public Control Committee, which had this matter in charge, made a report to the London County Council, after hearing Dr. Shaw's report, to the following effect:

That the Main Drainage Committee be authorized to allow Signor D. Maggiora the use of a site, on land held for main drainage purposes, in order to enable him to conduct experiments with his apparatus for the prevention and dispersal of fog, and that the grant of any such facilities to Signor Maggiora shall be made on the distinct understanding that the experiments are not being carried out under the direction of the Council, and that the name of the Council shall not be used in any way in connection with any application for financial aid for working the invention.

R. DEC. W.

RAINFALL OF THE LIGURIAN RIVIERA.—Dr. Eredia, of the Italian Central Meteorological Office, discusses the rainfall of the Ligurian Riviera in the *Rivista Agraria* for October, 1907. All reliable rainfall data for the district have been collected, and tabulated, and critically studied. The rainfall along the eastern Riviera is heavier at all seasons than that along the western. Autumn is the wettest and summer the driest period. Next to the autumn maximum, the winter is wettest at Genoa, San Remo and Spezia, *i. e.,* near the centre and the extremes of the province. The mean annual rainfalls are 52.8 inches at Genoa, 57.7 inches at Spezia, and 31.9 inches at San Remo. The period covers 1880-1905.

R. DEC.W.

A RAILWAY WIND-GAUGE.—About four years ago a wind-gauge was erected near Ulverston, in England, to protect trains from risk in traversing an exposed viaduct. In a recent number of *The Railway Magazine* (October, 1907), a description of this instrument is given. The apparatus is fixed at the west end of the Levens viaduct, and its actuating part consists of two boards, kept in a vertical position by springs, and the movements of which are shown by means of the customary pen and clockwork appliances. A pen is operated by either board according to the direction of the wind, and for greater exactitude of time, the chart paper, over 65 feet long, is perforated, the holes in the paper corresponding with studs in a clock-work wheel. When the wind-pressure reaches 32 lbs. to the square foot, the spring boards referred to are adjusted to make an electrical contact, ringing bells in the signal cabins on either side of the viaduct. When this occurs, all trains are detained until the force of the wind moderates, any such interruption being telegraphed to the superintendent of the line. The apparatus is tested weekly. It has been at work since September, 1903. In February, 1907, a velocity equivalent to 65 miles an hour was recorded.

R. DEC. W.

GEOGRAPHICAL FIELD STUDY IN EUROPE.—Professor W. M. Davis, of Harvard University, who started for Europe in April, proposes to spend June and most of July in northern Italy and the Alps studying certain geographical problems. He hopes to have associated with him a number of advanced students, already somewhat practiced in field study. The districts proposed for examination are in the foothills of the Apennines near Ancona, the non-glaciated valleys of the Apennines near Faenza, the basin of Florence, the Mediterranean coast between Pisa and Spezia, Spezia and Genoa and west of Genoa, the divide between the Mediterranean streams and the headwaters of the Po, and glaciated and non-glaciated valleys of lake basins in the Alps (Como, Lugano, Maggiore), and also in the French Alps. It is desired to treat the various problems in accordance with the methods of systematic physiography.

AGRICULTURE AND LIVE STOCK IN SCHLESWIG-HOLSTEIN.—The Agricultural Bureau of the province of Schleswig-Holstein publishes in two handsome volumes, "Bodenanbau und Viehstand in Schleswig-Holstein," Parts 1 and 2, a very thorough compilation by Mr. Th. H. Engelbrecht, based upon official statistics and relating to the conditions and distribution of the agricultural and live-stock industries in this northwestern province of Prussia. Part 2 (233 pp.), published at Kiel in 1905, gives a systematic tabulation of the facts, and is a good example of the minute analysis which the Germans bring to bear upon all elements of productivity and the resulting output. The percentage of the total area, for example, given to the various cultivated crops, in each small district, in the larger political divisions and in the province as a whole, is given for 1900, with comparative figures of area, yield, etc., at earlier enumerations. Part 1 (307 pp.), published in 1907, contains an exhaustive discussion of these tables, including a study of the various influences, as precipitation and soil varieties, that affected the results. Six sketch maps in colours give a graphic representation of the distribution of soils, farm lands, and crops.

POLAR.

MR. STEFANSSON RETURNS TO THE ARCTIC.—Mr. V. Stefansson, the ethnologist, left New York in April to resume his studies among the Eskimo of the Canadian Arctic coast and the neighbouring islands. His programme has been fully outlined in the BULLETIN (March, 1908, pp. 174-5), excepting the fact that he is accompanied by Captain Rudolph M. Anderson, who goes as his assistant to carry on zoological investigations for the American Museum of Natural History. Captain Anderson is the author of a large work on the birds of Iowa, a graduate of the University of Iowa and a Ph.D. in zoology. The party left Edmonton, Alberta, on May 21, to descend the Mackenzie.

KNUD RASMUSSEN'S NEW WORK.—Knud Rasmussen, the Danish ethnologist, whose book "Neue Menschen," in which he describes the Cape York Eskimo, has attracted considerable attention, left Upernivik, the most northerly settlement in Danish West Greenland, in the spring of 1907, to make a second visit to these natives for the further study of the people and their language. Later, accompanied by a single Eskimo, he started on a journey through Ellesmere Land and North Devon to visit the Baffin Land natives and begin his ethnological studies among these and other Eskimo groups.

MR. SHACKLETON'S ANTARCTIC EXPEDITION.—The *Geog. Journal* for April gives some further particulars of the landing of the Shackleton expedition now wintering in the Antarctic. The *Nimrod,* which took the party to its Antarctic camp, was badly strained during the storms encountered after the expedition left Lyttelton, N. Z., and members of the scientific staff as well as the crew had to take their turn at the pumps. The steamer *Koonya* towed the *Nimrod* till ice was sighted on Jan. 15. After her departure the course of the *Nimrod* was directed south along the 178th meridian of W. Long. For several hours on Jan. 16, the vessel threaded her way among large icebergs, but the open waters of Ross Sea were reached without any sign of the pack ice, through which earlier expeditions had to force a passage.

The Ice Barrier was sighted on Jan. 22, and the expedition then turned eastward to carry out Shackleton's intention of establishing winter quarters on King Edward VII Land. He reports, however, that access to the land in this direction was barred by the ice. Repeated spells of bad weather were experienced, and at last he decided to make for McMurdo Sound at the west end of the Ice Barrier. Here winter quarters were established on Cape Royds under the shadow of Mount Erebus, about 20 miles north of the *Discovery's* winter quarters. The landing of the motor car, ponies, dogs, and other equipment was accomplished with some difficulty, and on one occasion the *Nimrod* was blown out to sea in a blizzard with a temperature of 16° Fahr. below zero.

The landing party appears to be fifteen strong, having been joined by Prof. David, of Sydney, Mr. Marson, a chemist and physician of Adelaide, and Mr. Armytage, a hunter and traveller of Melbourne. Since the *Discovery* expedition, the region around McMurdo Sound is not virgin territory in the same sense as is King Edward VII Land, but there is plenty of room for good scientific work, and no doubt a great effort will be made to reach the pole. The *Nimrod* is to return for the explorers early in 1909. It is reported that Captain England has resigned his command, and, according to a telegram from Wellington, it is doubtful whether the magnetic survey in the Indian Ocean which was allotted as the work of the *Nimrod* during the coming year will be undertaken.

VARIOUS.

THE ROYAL GEOGRAPHICAL SOCIETY AND MR. BOYNTON.—Much has been published in the newspapers about an expedition that was being organized in Boston by Mr. George Melville Boynton for a journey across South America. Mr. Boynton has been repeatedly represented as saying that his party was to go out under the auspices of the Royal Geographical Society. The April number of the *Geog. Journal* prints a note from the Council of that Society declaring that it has nothing whatever to do with the expedition, and adding that the Council has no means of forming an opinion on the organization or objects of the expedition, or on the competency of its Commander.

PROF. W. H. HOBBS, of the University of Michigan, with two assistants, will make a special study of the glacial formation of the Alps during the summer.

PROF. J. B. WOODWORTH, of Harvard University, will take charge of the Shaler Memorial Expedition to South America, which will leave New York in

June for Rio de Janeiro and remain in Brazil until the rainy season in October. The Brazilian Government will give it special facilities. After leaving Brazil, Prof. Woodworth intends to investigate shore-line changes along the coast of Chile.

AN ADDITIONAL GRANT of £200 has been given out of the Common University Fund to the Oxford School of Geography for the present school year. The report for 1907 shows that the number of students slightly increased throughout the three terms. The equipment of the school is being constantly improved.

IN ITS UNTIRING EFFORTS to present the attractions of Sweden to tourists, the Swedish Tourist Traffic Society has compiled a small and finely illustrated handbook describing Sweden's place in history, her economic resources, social conditions and aims, educational system, her representative men of science, scientific institutions, sporting life, and art collections.

DR. GILBERT AT THE UNIVERSITY OF PENNSYLVANIA.—In presenting Grove Karl Gilbert for the honorary degree of LL.D. at the University of Pennsylvania in March, Prof. W. B. Scott of Princeton University said:

> For nearly forty years one of the most distinguished of those brilliant investigators who have adorned the successive organizations culminating in the present U. S. Geological Survey, you have enriched geology by a series of studies and contributions of striking originality and importance, which have led to new conceptions of the earth's history and opened new fields of investigation. As a pioneer in what may almost be called the American science of physiography, your work is recognized and valued the world over as being of the highest significance. Therefore, at the request of the Trustees of the University of Pennsylvania, I ask the Provost to confer upon you, Grove Kar Gilbert, the degree of doctor of laws.

ONE OF THE INTERESTING human responses to climate is brought out by Mr. Ralph H. Hess in an article, "The Passing of the Doctrine of Riparian Rights," in *The American Political Science Review* for November, 1907. The author briefly traces the development of law with respect to the use of running water for irrigation. The Roman law, developed in Italy where irrigation was useful, provided for irrigation rights. In England, a humid country, much of the Roman law was embodied in the common law, but the provisions for irrigation were not applicable or necessary and were not made a part of the common law. The common law provided with care for the rights of the navigator. On non-navigable streams the riparian owner could use the water, but he must return it to the original channel without notable diminution. The common law has, in general, spread to the humid states of North America.

When the settlers began to occupy the arid and semi-arid portions of the United States, it was found that running water had a value far beyond that for navigation and manufacturing. The specific legal response to the new conditions was the doctrine of appropriation, that is, "he who first turns aside stream or lake waters and applies them to beneficial use, was first in a right commensurate with that use." The origin of the doctrine, however, in the arid West, lay not in the use of the water for irrigation, but in its use for placer mining. The first settlers in large numbers were miners, and their practice in the use of flowing water for mining was adopted in irrigation. The new law gives the riparian land owner no special advantage in the use of the water over those whose lands do not touch the stream. Indeed, in the use of the stream for irrigation, the land owner in another watershed may use the stream in preference to the riparian owner, provided he first acquired the right by use. Mr. Hess traces the doctrine of appropriation as applied in various States and mentions some of the problems, such as inter-State water rights, which are as yet unsolved. F. V. E.

WORLD DIAGRAMS OF POPULATION, TEMPERATURE, RAINFALL AND PLANT DISTRIBUTION.—A Supplement to Teachers' Geography. By Mark Jefferson, Professor of Geography in the Michigan State Normal College. Published by the author. Ypsilanti, Mich. 1908.

Professor Jefferson has put into the hands of teachers a very useful set of outline maps of the world, showing the population on a five-degree scale (very dense, dense, moderate, thin, scanty); Köppen's map of temperature zones (see this BULLETIN, July, 1905); rainfall (for June, July and August; for December, January and February; and for the year), and plant regions (after Schimper). The maps are clear; the important points are well emphasized, and all unnecessary details are omitted. Well-chosen questions on each of the maps are given, in order that the student may "reproduce the facts of the diagrams in words." For laboratory work in geography these charts will prove very useful, and they will surely help to systematize instruction along these lines. R. DEC. W.

CITY FOG AND COUNTRY FOG.—The difference between the "dry" fog of a city like London and the "wet" fog of the surrounding country has frequently been noted. A striking example of the difference between these two forms of fog is given by L. C. W. (Bonacina), in *Symons's Monthly Meteorological Magazine* for December, 1907. On November 11, 1907, at 7 P. M., a thick, dry fog prevailed in London, with pungent fumes of oxide of sulphur very noticeable. It was so dark that torches were carried in the streets and fires were placed at street junctions. Fifteen miles out of London, at 8.30 P. M., there was a fog as dense as in the city, but perfectly pure and very wet. In fact, a drizzling rain was falling. R. DEC.W.

AMERICAN GEOGRAPHICAL SOCIETY.—A Regular Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, Tuesday, April 21, 1908, at 8.30 o'clock, P. M.

Vice-President Greenough in the chair. The following person, recommended by the Council, was elected to Fellowship:

Charles A. Clark.

The Chairman then introduced Mr. Homer B. Hulbert, who addressed the Society on Korea, Past and Present.

Stereopticon views were shown.

On motion, the Society adjourned.

The Council of the Society, at a meeting held on the 19th of March, awarded the Charles P. Daly Medal to Prof. George Davidson of the University of California.